



## NUCLEAR REGULATORY COMMISSION

### 10 CFR Part 110

[NRC-2014-0201]

RIN 3150-AJ45

### Updates on the Export of Deuterium

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Final rule.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is revising its regulations to remove the NRC's licensing authority for exports of deuterium for non-nuclear end use. The responsibility for the licensing of exports of deuterium for non-nuclear end use is being transferred to the Department of Commerce's Bureau of Industry and Security. The Bureau of Industry and Security is publishing a final rule in this edition of the *Federal Register* to include such exports under its export licensing jurisdiction. Exports of deuterium for nuclear end use will remain under the NRC's export licensing jurisdiction.

**DATES:** This final rule is effective on **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

**ADDRESSES:** Please refer to Docket ID NRC-2014-0201 when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Website:** Go to <https://www.regulations.gov> and search for Docket ID NRC-2014-0201. Address questions about NRC dockets to Dawn Forder; telephone: 301-415-3407; email: [Dawn.Forder@nrc.gov](mailto:Dawn.Forder@nrc.gov). For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC's Agencywide Documents Access and Management System**

**(ADAMS):** You may obtain publicly-available documents online in the ADAMS Public

Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in the SUPPLEMENTARY INFORMATION section.

- **Attention:** The PDR, where you may examine and order copies of public documents is currently closed. You may submit your request to the PDR via e-mail at [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov) or call 1-800-397-4209 between 8:00 a.m. and 4:00 p.m. (EST), Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Janice Owens, Office of International Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-287-9096; email: [Janice.Owens@nrc.gov](mailto:Janice.Owens@nrc.gov).

## **SUPPLEMENTARY INFORMATION:**

### **I. Background**

Section 109 of the Atomic Energy Act of 1954 (AEA), as amended by the Nuclear Non-Proliferation Act of 1978 (NNPA), authorizes and directs the NRC, after consultation with the Secretaries of State, Energy, and Commerce, to exercise its export licensing authority over “items or substances” determined by the Commission to be “especially relevant from the standpoint of export control because of their significance for nuclear explosive purposes” (42 U.S.C. 2139(b)). Since 1978, under this authority the NRC has exercised jurisdiction over all exports of deuterium, including heavy water, as well as deuterium gas and other deuterated compounds for both nuclear and non-nuclear end uses. In the early years of the nuclear energy industry, deuterium oxide (heavy water) was largely produced for use in nuclear reactors. High-purity reactor grade heavy water, which has a deuterium concentration of 99.75 percent or greater, has been used to operate reactors with natural uranium.

In the last decade, the market for deuterium has significantly expanded and

evolved beyond nuclear reactor use. Non-nuclear use of deuterium includes, but is not limited to manufacture of advanced electronics, deuterated solvents, deuterated pharmaceuticals, hydrogen arc-lamps, neutron generators, and tracers in hydrological, biological, and medical studies. Despite this market change, the NRC has continued to control all exports of deuterium under the general or specific export licensing provisions in part 110 of title 10 of the *Code of Federal Regulations* (10 CFR), "Export and Import of Nuclear Equipment and Material." The NRC has determined, in consultation with the Executive Branch, that it is appropriate to revise its regulations and transfer the export licensing control of non-nuclear end use of deuterium to the Department of Commerce as was done for the non-nuclear end use of nuclear grade graphite in 2005 (70 FR 41937; July 21, 2005).

Under current NRC regulations, if an export of deuterium is not authorized under the general license in § 110.24, then a specific NRC export license is required.

Paragraph (a) of the general license authorizes export of deuterium to countries that are not embargoed destinations (§ 110.28) or restricted destinations (§ 110.29) in quantities of 10 kg or less (50 kg of heavy water) with an annual limit of 200 kg (1,000 kg heavy water) to any one country. Paragraph (b) of § 110.24 authorizes deuterium export to restricted countries (§ 110.29) in quantities of 1 kg or less (5 kg of heavy water) with an annual limit of 5 kg (25 kg of heavy water) to any one restricted country.

Over the past 10 years, the quantity of deuterium exported for non-nuclear end use has steadily increased. A growing number of companies have been required to obtain specific licenses to export deuterium for non-nuclear use because the quantity exceeded the general license quantity thresholds. The NRC's recent licensing experience has shown that deuterium has been exported almost exclusively for non-nuclear industrial and research end use, prompting the reevaluation of NRC licensing requirements concerning these non-nuclear end use exports. Other supplier nations have export controls over deuterium but have limited them to cover exports "for use in a nuclear reactor." This limitation appears in both the Nuclear Non-Proliferation Treaty

Exporters Committee (Zangger Committee) and the Nuclear Suppliers Group (NSG) clarification of items on the Trigger List; see, for example, International Atomic Energy Agency INFCIRC/209/Rev.5 (March 2020)<sup>1</sup> and INFCIRC/254/Rev.14/Part 1 (October 2019),<sup>2</sup> respectively. The United States is a member of the Zangger Committee and a participating government of the NSG.

The history of the use of deuterium exported under the NRC's authority indicates that deuterium has not been diverted for known illicit purposes to produce weapons-grade material or for use in unsafeguarded nuclear activities. To the extent that any risk of diversion may exist, exports of deuterium for non-nuclear end use will continue to be controlled by the Department of Commerce, and appropriate control mechanisms exist within national regulatory authorities and the international community to detect efforts to divert deuterium for known illicit purposes.

## **II. Discussion**

The NRC is revising its regulations that govern the export and import of nuclear equipment and material in 10 CFR part 110. The revisions are necessary to reflect technological advances involving the use of deuterium, including heavy water, as well as deuterium gas and deuterium or deuterated compounds (deuterium) for non-nuclear industrial and research activities. These changes will also harmonize U.S. export control of deuterium with international standards.

Based on the foregoing, the NRC has determined, after consultation with the Executive Branch, including the Departments of State, Energy, Defense, and Commerce, that deuterium for non-nuclear end use is not an item or substance that is "especially relevant from the standpoint of export control because of [its] significance for nuclear explosive purposes." The Executive Branch concurs in the NRC's determination. The NRC has not, however, made the same finding under Section 109b. of the AEA with respect to exports of deuterium for nuclear end use, which the NRC will

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<sup>1</sup> <http://zanggercommittee.org/download/18.6a32cf891717bf4c02d11/1588579969571/infirc209r5.pdf>

<sup>2</sup> <https://www.iaea.org/sites/default/files/publications/documents/infircs/1978/infirc254r14p1.pdf>

continue to regulate as a material “especially relevant for export control because of [its] significance for nuclear explosive purposes.” The NRC is also retaining authority for licensing exports of plants for the production, separation, or purification of heavy water, deuterium and deuterium compounds and especially designed or prepared assemblies or components for these plants. As such, no changes are being made to § 110.8(g) or appendix K to 10 CFR part 110.

The definition of *Deuterium* in § 110.2 is being revised to include what *deuterium for nuclear end use* means in the context of shared jurisdiction with Department of Commerce’s Bureau of Industry and Security. The revised definition is consistent with the Zangger Committee Understandings documented in INFCIRC/209 and the NSG Guidelines documented in INFCIRC/254/Part 1.

The general license authorizing the export of deuterium for nuclear end use remains under NRC jurisdiction. The general license for the export of deuterium for nuclear end use found in § 110.24 is being revised to reflect that NRC jurisdiction applies to deuterium exports for nuclear end use only.

This final rule eliminates the licensing burden on exporters of deuterium for non-nuclear end use which, under current industry trends, constitutes the majority of deuterium being exported. Removing exports of deuterium for non-nuclear end use from 10 CFR part 110 also reduces recordkeeping and reporting requirements for those licensees who will no longer require specific licenses for exports of deuterium for non-nuclear end use.

Accordingly, the NRC concludes, with the concurrence of the Executive Branch, that exports of deuterium for non-nuclear end use are not especially relevant from the standpoint of export control because of their lack of significance for nuclear explosive purposes, and that control over such exports is most appropriately vested with the Department of Commerce. The NRC has determined that this rule will pose no unreasonable risk to the public health and safety or the common defense and security. The Department of Commerce is publishing regulations establishing licensing controls

over this class of material in the RULES category of this issue of the *Federal Register*.

During the 60-day delay in the effective date for both rules, the NRC will contact existing licensees and persons with pending license applications affected by this transfer of jurisdiction to the Department of Commerce to ensure an uninterrupted transition from one regulatory authority to another.

### **III. Summary of Changes**

#### **Section 110.2 Definitions.**

This final rule revises the definition for *Deuterium* to clarify the difference between deuterium used for nuclear end use versus non-nuclear end use and to recognize the Department of Commerce as the regulatory authority for exports of deuterium for non-nuclear end use.

#### **Section 110.9 List of Nuclear Material under NRC export licensing authority.**

This final rule revises paragraph (d) to include the phrase “for nuclear end use” after deuterium to clarify that the NRC has export authority over deuterium for nuclear end use only.

#### **Section 110.24 General license for the export of deuterium.**

This final rule adds the phrase “for nuclear end use” to clarify that the general license for deuterium only applies to exports of deuterium for nuclear end use.

#### **Section 110.40 Commission review.**

This final rule revises paragraph (b)(5)(iii), redesignates paragraph (b)(5)(iv) as paragraph (b)(5)(v) and adds new paragraph (b)(5)(iv) to add “for nuclear end use” after “heavy water” to clarify that Commission review of license applications under this section only applies to an application to export 250 kilograms of heavy water for nuclear end.

#### **Section 110.41 Executive Branch review.**

This final rule revises paragraph (a)(4), redesignates paragraphs (a)(5) through (a)(10) as paragraphs (a)(6) through (a)(11), and adds new paragraph (a)(5) to clarify that Executive Branch review under this section only applies to an application to export

of deuterium for nuclear end use.

#### **Section 110.42 Export licensing criteria.**

This final rule revises paragraph (b) to add the phrase “for nuclear end use” to clarify that NRC export licensing jurisdiction over deuterium is limited to nuclear end use.

#### **Section 110.54 Reporting requirements.**

This final rule revises paragraph (a)(1) to add the phrase “for nuclear end use” after each mention of deuterium to clarify that reporting requirements for exports of deuterium only apply to exports of deuterium for nuclear end use.

#### **Section 110.70 Public notice of receipt of an application.**

This final rule revises paragraph (b)(3) to add the phrase “for nuclear end use” to clarify that the NRC will notice the receipt of export applications for 10,000 kilograms or more of heavy water for nuclear end use, excluding exports of heavy water to Canada for nuclear end use.

### **IV. Rulemaking Procedure**

Because this rule involves a foreign affairs function of the U.S., the notice and comment provisions of the Administrative Procedure Act do not apply (5 U.S.C. 553(a)(1)).

### **V. Regulatory Flexibility Certification**

The Regulatory Flexibility Act does not apply to regulations for which a Federal agency is not required by law, including the rulemaking provisions of the Administrative Procedure Act, 5 U.S.C. 553(b), to publish a general notice of proposed rulemaking (5 U.S.C. 604). As discussed in this document under Section IV, “Rulemaking Procedure,” this final rule is exempt from the requirements of 5 U.S.C. 553(b). Accordingly, the NRC also determines that the requirements of the Regulatory Flexibility Act do not apply to this final rule.

### **VI. Regulatory Analysis**

The NRC has sole control of the export of deuterium for nuclear applications. There is no other alternative to amending the regulations at 10 CFR part 110 to reflect

changing circumstances. This final rule will reduce the burden on licensees and the cost to the public without posing an unreasonable risk to the public health and safety or to the common defense and security.

## **VII. Backfitting and Issue Finality**

The NRC has not prepared a backfit analysis for this final rule. This final rule does not involve any provision that would impose a backfit, nor is it inconsistent with any issue finality provision, as those terms are defined in 10 CFR chapter I.

## **VIII. Plain Writing**

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, "Plain Language in Government Writing," published June 10, 1998 (63 FR 31885).

## **IX. Environmental Impact: Categorical Exclusion**

The NRC has determined that this final rule is the type of action described in categorical exclusion 10 CFR 51.22(c)(1). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this final rule.

## **X. Paperwork Reduction Act**

This final rule does not contain a collection of information as defined in the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995.

### **Public Protection Notification**

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

## **XI. Congressional Review Act**

This final rule is a rule as defined in the Congressional Review Act (5 U.S.C. 801-808). However, the Office of Management and Budget has not found it to



be a major rule as defined in the Congressional Review Act.

### List of Subjects in 10 CFR Part 110

Administrative practice and procedure, Classified information, Criminal penalties, Exports, Incorporation by reference, Imports, Intergovernmental relations, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Penalties, Reporting and recordkeeping requirements, Scientific equipment.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR part 110:

### PART 110—EXPORT AND IMPORT OF NUCLEAR EQUIPMENT AND MATERIAL

1. The authority citation for part 110 continues to read as follows:

**Authority:** Atomic Energy Act of 1954, secs. 11, 51, 53, 54, 57, 62, 63, 64, 65, 81, 82, 103, 104, 109, 111, 121, 122, 123, 124, 126, 127, 128, 129, 133, 134, 161, 170H, 181, 182, 183, 184, 186, 187, 189, 223, 234 (42 U.S.C. 2014, 2071, 2073, 2074, 2077, 2092, 2093, 2094, 2095, 2111, 2112, 2133, 2134, 2139, 2141, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2160c, 2160d, 2201, 2210h, 2231, 2232, 2233, 2234, 2236, 2237, 2239, 2273, 2282); Energy Reorganization Act of 1974, sec. 201 (42 U.S.C. 5841); Administrative Procedure Act (5 U.S.C. 552, 553); 42 U.S.C. 2139a, 2155a; 44 U.S.C. 3504 note.  
Section 110.1(b) also issued under 22 U.S.C. 2403; 22 U.S.C. 2778a; 50 App. U.S.C. 2401 etseq.

2. In § 110.2, revise the definition of *Deuterium* to read as follows:

#### § 110.2 Definitions.

\* \* \* \* \*

*Deuterium* means deuterium and any deuterium compound, including heavy water, in which the ratio of deuterium atoms to hydrogen atoms exceeds 1:5000; and *deuterium for nuclear end use* means deuterium and any deuterium compound, including heavy water, in which the ratio of deuterium atoms to hydrogen atoms exceeds

1:5000, that is intended for use in a nuclear reactor. Export of deuterium and deuterium compounds, including heavy water, for non-nuclear end use is regulated by the Department of Commerce.

\* \* \* \* \*

3. In § 110.9, revise paragraph (d) to read as follows:

**§ 110.9 List of Nuclear Material under NRC export licensing authority.**

\* \* \* \* \*

(d) Deuterium for nuclear end use.

\* \* \* \* \*

4. Revise § 110.24 to read as follows:

**§ 110.24 General license for the export of deuterium for nuclear end use.**

(a) A general license is issued to any person to export to any country not listed in § 110.28 or § 110.29:

(1) Deuterium and deuterium compounds (other than heavy water) for nuclear end use in individual shipments of 10 kilograms or less, not to exceed 200 kilograms per calendar year to any one country; and

(2) Heavy water for nuclear end use in individual shipments of 50 kilograms or less, not to exceed 1,000 kilograms per calendar year to any one country.

(b) A general license is issued to any person to export to any country listed in § 110.29:

(1) Deuterium and deuterium compounds (other than heavy water) for nuclear end use in individual shipments of 1 kilogram or less, not to exceed 5 kilograms per calendar year to any one country listed in § 110.29; and

(2) Heavy water for nuclear end use in individual shipment of 5 kilograms or less, not to exceed 25 kilograms per calendar year to any one country listed in § 110.29.

5. In § 110.40, revise paragraph (b)(5)(iii), redesignate paragraph (b)(5)(iv) as paragraph (b)(5)(v), and add new paragraph (b)(5)(iv) to read as follows:

**§ 110.40 Commission review.**

\* \* \* \*

(b) \* \* \*

(5) \* \* \*

(iii) 250 kilograms of source material;

(iv) 250 kilograms of heavy water for nuclear end use; or

\* \* \* \*

6. In § 110.41, revise paragraph (a)(4), redesignate paragraphs (a)(5) through (a)(10) as paragraphs (a)(6) through (a)(11), and add new paragraph (a)(5) to read as follows:

**§ 110.41 Executive Branch review.**

(a) \* \* \*

(4) More than 3.7 TBq (100 Curies) of tritium;

(5) Deuterium for nuclear end use, other than exports of deuterium to Canada;

\* \* \* \*

7. In § 110.42, revise paragraph (b) introductory text to read as follows:

**§ 110.42 Export licensing criteria.**

\* \* \* \*

(b) The review of license applications for the export of nuclear equipment, other than a production or utilization facility, and for deuterium for nuclear end use and nuclear grade graphite for nuclear end use is governed by the following criteria:

\* \* \* \*

**§ 110.54 [Amended]**

8. In § 110.54(a)(1), add the phrase “for nuclear end use” after the word “deuterium” wherever it appears.

9. In § 110.70, revise paragraph (b)(3) to read as follows:

**§ 110.70 Public Notice of receipt of an application.**

\* \* \* \*

(b) \* \* \*

(3) 10,000 kilograms or more of heavy water for nuclear end use. (Note: Does not apply to exports of heavy water to Canada for nuclear end use.)

\* \* \* \* \*

Dated: September 21, 2021.  
For the Nuclear Regulatory Commission.

Margaret Doane  
Executive Director  
for Operations.

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